Photocatalytic Removal of Sulfathiazole Antibiotic from Aqueous solution using UV/ TiO_2 Process

Abstract

Background: In recent years, the presence of pharmaceutical contaminants, especially antibiotics Due to its cumulative nature, adverse effects and drug resistance has created much concern for environmental experts. Therefore, in this study was investigated the removal of sulfathiazole in aquatic environments using UV / TiO_2 process.

Materials and Methods: This experimental study was conducted on a laboratory scale and in a batched system. In this study, sulfathiazole removal was investigated using titanium dioxide nanoparticle and ultraviolet light 6W. The effects of factors such as pH of solution (2-7), reaction time (5-120 min), dose of nanoparticle (0.2-2 g/L) and the initial concentration of sulfathiazole (5-100 mg/L) were studied on the removal efficiency.

Results: The result of this study showed that pH plays an important role on removal of sulfathiazole antibiotic by UV/TiO_2 process and removal efficiency is higher at lower pH. . Removal efficiency was increased with increasing contact time and TiO_2 concentration. Maximum efficiency was 91.97 % that in obtained time 60 min, pH =3, TiO_2 concentration of 1.5 g/L and sulfathiazole initial concentration of 25 mg/L.

Conclusion: The results of this study suggested that UV/ TiO_2 photocatalytic process is an effective process and can be used to remove sulfathiazole antibiotic from aqueous solution.

Keywords: Photocatalyst, Nano titanium oxide, Ultra violet, Sulfathiazole